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Monthly Progress Report No. 12

System No. 1

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27 November 1955 to 25 December 1955

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Copy 3 of 7

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1-0. ANTENNAS. A total of ten S-band and two X-band assemblies have been shipped to date. Five S-band assemblies and four X-band assemblies are finished, and six additional X-band assemblies are in the Test Section.

2-0. INFORMATION AMPLIFIERS. To date, twelve amplifiers have been shipped, three are finished and nine are in the Test Section. All twenty-four amplifiers have a dynamic range of 46 db to 58 db. At the high end of the dynamic range all amplifiers have an increased gain of about 3 db. The combination of bias and signal levels at the grid circuit of the last video amplifier accounts for this increased gain. At the low end of the dynamic range twenty-one amplifiers have a maximum deviation from linearity of about 3 db. Three amplifiers exceed this by 1 or 2 db. At the center of the dynamic range, twenty-one amplifiers have an over-all gain of 17 db, $\pm$ 1 db, and a video gain of 40 db, $\pm$ 1 db. Three amplifiers have a gain variation of $\pm$ 2 db relative to the nominal 17-db over-all gain.

3-0. VIBRATOR POWER SUPPLIES. To date, six power supplies have been shipped, five are finished, and seven are in the Test Section. The previous progress report noted several vibrator failures which were traced to a particular production run of vibrators. The failures were apparently caused by defects in the manufacturing process.

4-0. INFORMATION RECORDERS.

4-1. To date, three information recorders have been shipped and two are in the Test Section. The first four recorders will be returned for re-work when they can be replaced with other units. Recorder number five will be re-worked before it is shipped.

4-2. The re-work consists of replacing the present reel guides with nylon rollers and replacing the present reels with metal reels. The present reel guides have too much friction and do not allow a full ten hours of tape to be wound on the reel. The two units in the Test Section have metal reels, but these reels require special shims.

5-0. TEST SET.

5-1. The test set is being re-worked. Two of the original units have been shipped and one of these has been returned for re-work.

5-2. The re-work consists of building a Tektronix type 310 oscilloscope unit into the test set and of increasing the power output of the klystrons. The Tektronix unit is small and versatile and its use in the test set will save considerable time in the re-work.

5-3. The relationship between the C-W power, as measured on the thermistor bridge, and the peak pulse power has been determined. The peak pulse power will be within 0.5 db of the measured C-W power for either S-band or X-band operation. This represents the maximum deviation measured at several frequencies. The deviation at the center frequencies of the bands will be considerably less than 0.5 db.

6-0. TEST EQUIPMENT. A simple test unit has been designed to check the recorder electronics. All the recorder electronics are contained on a single printed-circuit board. This board may be plugged into the test unit to check all circuits for proper operation. The test unit is being included in the list of Unit Essential Equipment. Parts are on order and the first unit should be available during the next reporting period.

7-0. A SUGGESTED TEST-SITE TRAINING SCHEDULE.

7-1. A three-month schedule of field training has been suggested by the contractor's field representative to the Government field representatives for the purpose of giving operating experience to technical personnel responsible for the operation and maintenance of System 1. Conditions at the test site would be set up to simulate as closely as possible those anticipated during field operations. It is assumed that personnel participating in the training program have previously undergone formal classroom training in the theory and operation of the system. Training at the test site in the operation and maintenance of the ARC-34 Communication Equipment and the ARN-6 Automatic Direction Finder is also desirable and should be included. Air crews should be indoctrinated in the use of the system to the extent that they can intelligently perform their mission.

7-2. A secondary purpose of this training period would be to determine the reliability of the system under actual operating conditions. Insofar as possible, all replacements, repairs, etc., should be made from the Fly-Away Kit. When an item is needed that is not included in the Fly-Away Kit, it can be obtained through the vendor's representative. Complete records should be kept of items obtained from the Fly-Away Kit, as well as items obtained from the vendor.

7-3. As of the first week in January, five complete systems will be available for the test site training period. Four of the five systems are S-band equipment. Three S-band systems are installed in the 300 series aircraft. The other S-band system will be installed in the 300 series aircraft. During the training period the equipment should be operated as much as possible in the aircraft. The total operating time for each system should equal at least twenty hours per week. In case the operating time

falls short of this figure, the equipment should be operated on the bench to make up the deficiency.

7-4. The fifth system is an X-band system and is installed in a type T-33 aircraft. This system should be utilized to obtain additional flight test data as needed.

7-5. PREFLIGHT CHECK. Preflight checks should be made, and the preflight check list should be filled out before each flight. Only those units of test equipment designated for Advance Base Operations should be used for the preflight check. The preflight check should be carried out by a team of two men who will be responsible for the particular flight. Installation of the recorder is considered part of the preflight check. Sufficient time should be allowed so that the preflight check is completed by take-off time minus one hour. The take-off and landing times should be noted and recorded on both the preflight form and the recorder log form. Sample forms have been prepared by the contractor. A brief description of the flight, including altitudes and other pertinent data, should be obtained and noted on the back of the preflight form.

7-6. PREVENTATIVE MAINTENANCE (50 HOURS). After fifty hours of operation, the system electronic units should be removed from the aircraft for preventative maintenance. Detailed maintenance instructions for the System 1 units are included in the System 1 Instruction Guide.

7-7. ARC-34 AND ARN-6. Preflight checks and preventative maintenance should be carried out on the ARC-34 and ARN-6. Technical manuals describing these systems should be available at the facility. Both the preflight check and preventative maintenance should be performed in accordance with Air Force Standards.

7-8. DUBBING. All personnel concerned with System 1 should become familiar with the dubbing technique. Data obtained during flight should be dubbed on standard tape for playback purposes.

8-0. INSTRUCTION GUIDE. The System No. 1 Instruction Guide will be ready for delivery during the week of January 15, 1956.

9-0. MAN-HOURS. A total of 6469 man-hours were expended during this report period.